THREE TEXT-BOOKS OF PHYSICS.

(1) *A Manual of Practical Physics*. By H. E. Hadley. Pp. viii+262. (London: Macmillan and Co., Ltd., 1916.) Price 3*s*.

(2) *Text-book of Mechanics*. By Prof. Louis A. Martin, jun. Pp. xviii+313. Vol. vi: *Thermodynamics*. (London: Chapman and Hall, Ltd., 1916.) Price 7*s*. 6*d*. net.

(3) *An Intermediate Text-book of Magnetism and Electricity*. By G. F. Woodhouse. Pp. x+264. (Sedbergh: Jackson and Son, 1916.) 6*s*. net.

IT is always of interest to study text-books written by those engaged in teaching, and to note the special points which their experience as teachers leads them to emphasise.

(1) Mr. Hadley, who is principal of the School of Science at Kidderminster, is the author of a number of excellent works on physics, and the present small volume gives further proof of his ability as a clear exponent of physical principles. The book is suitable for the upper classes at schools where practical physics forms, as it should do, part of the science course. It is scarcely correct to say that it covers the work necessary for a present-day intermediate course, as many of the experiments described are qualitative rather than quantitative, and some are more suitable for the teacher to demonstrate in front of his class than for the students themselves to carry out. A noteworthy feature is the simple apparatus required for most of the work—the determination of the centre of gravity of a wickerwork basket suggests a new use for the editorial wastepaper basket!

It is open to question whether it is desirable to retain the definition of specific heat as a ratio (p. 116). In actual practice what is required most frequently is the "thermal capacity of unit mass," which is expressed in calories per gram per degree. Unless this is used the "dimensions" of an ordinary heat equation are incorrect. We may note in passing that for the same reason the value of a latent heat should be expressed, not in calories (p. 122), but in calories per gram. It has been pointed out in NATURE (vol. xcv., p. 427) that the British use of "specific" is hopelessly inconsistent, and it is only necessary to compare the definition of specific resistance on p. 225 with that of specific heat to appreciate the absurdity of our present nomenclature. A new term to denote the thermal capacity of unit mass of a substance is much to be desired.

A series of observations with an ammeter and a tangent galvanometer is followed by the remark: "This demonstrates that the current is proportional to the tangent of the angle of deflection." As the tangent galvanometer is an absolute instrument, it is obvious that no such result can be proved by its use.

(2) Prof. Martin has produced a useful text-book on thermodynamics for engineering students. It forms the sixth volume of a series by the same author. Without going into excessive detail the writer has succeeded in giving a remarkably clear outline of the essentials of the subject. Although the treatment is elementary, differential equations are used throughout, their meaning being explained in such a way as to lead the student forward step by step. A large number of numerical exercises are provided throughout the work and at the end of the book. British thermal units are alone employed. The diagrams are very good, and the typography is such as to give every assistance to the student in his study of the subject.

(3) The "Intermediate Text-book of Magnetism and Electricity," by Mr. Woodhouse, senior science master at Sedbergh School, combines practical instruction with theoretical discussion. A large number of simple experiments described in the text may be carried out by the student with no great outlay in apparatus. The author is probably right in saying that the electrolytic definition of the unit of current is more readily grasped by the average student than the electro-magnetic, but we are of opinion that greater emphasis should be laid on the distinction between the practical definitions of electrical units (the so-called international units) and the absolute definitions. The book would be much improved by a careful revision: the style is frequently curt and sometimes inelegant. Many students have been penalised in examinations for giving as the second law of electrolysis: "The weight of an element deposited is proportional to the electro-chemical equivalent." The strength of a magnetic field is not measured in dynes (p. 53), but in dynes per unit pole or gausses.

We strongly endorse the opinion of the author that all students of physics should learn the calculus. A portion of Appendix I. is devoted to explaining, briefly, the principles and method of differentiating and integrating simple quantities. Several well-known text-books of physics are marred by attempts to evade the use of the calculus. It is far better to adopt the author's plan and devote a little space and time to introducing the elements of the calculus than to employ tedious and unnecessary investigations which are only differentiation or integration in disguise. Appendix II. contains a description by Mr. J. W. Shepherd of a wireless set which, in more favourable days than the present, may be set up by the student who has obtained permission from the Postmaster-General.

H. S. A.

OUR BOOKSHELF.

Le Climat de la France: Température, Pression, Vents. By G. Bigourdan. Pp. 135. (Paris: Gauthier-Villars et Cie.) Price 4 fr.

THIS publication, dealing particularly with temperature, pressure, and winds, is rather a compilation than otherwise, free use being made of the original scientific discussions by M. Angot. Temperature observations made in France go back to the middle of the seventeenth century, but, as in other countries, the early observations were made with imperfect instruments, and the exposure was often bad, the results in consequence being unsatisfactory. There are only fourteen

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stations in France at which the observations cover a period of fifty years, from 1851–1900, but fairly long periods are given for fifty-eight stations which constitute the principal values dealt with. Mean temperature charts are given for each month, and there are also seasonal charts for winter, summer, and for the year. Diurnal range of temperature is also dealt with. Barometric pressure is treated in a very similar manner to the temperature, and mean pressure charts are given for all months and for the year. A chapter is devoted to the disturbances of the atmosphere, and a detailed description is given of the general movement of cyclonic and anticyclonic systems. Maps are given showing the prevailing winds and the resultants for the four seasons of the year. M. Bigourdan provides a good *résumé* of the climate of France in about 130 pages, and the information is expressed in a popular manner, although its scientific accuracy is all that could be wished. The numerous charts enable the reader to obtain the several meteorological factors for any part of France.

The Psychology of Relaxation. By Prof. G. T. Patrick. Pp. viii+280. (London: Constable and Co., Ltd., 1916.) Price 5*s.* net.

ON the further side of the Atlantic one of the world's great peoples has been swept away by a passion for wild and crazy amusement; on this side the others are locked in the bloodiest war the world has seen: these are the phenomena, at first sight antithetically diverse, which Prof. Patrick brings together in his study of "relaxation." With them he sets the craving for alcohol, constantly rising in spite of prohibitive legislation, and—*longo intervallo*—the habits, widespread if not omnipresent, of laughter and profane language. In the author's view all these forms of human behaviour are, at bottom, illustrative of a single principle. The activities and relations of civilised life imply the upbuilding and functioning of extremely complex mental mechanisms, full of tensions, restraints, and inhibitions. To maintain these always in operation is an impossible task. From time to time, therefore, the complexes break up, and man falls back with relief into conduct expressive of simpler mental structures organised and consolidated in the far distant days of the race's childhood: he plays, he laughs, he swears, he fights. Alternatively, he seeks the same end—the temporary dissociation of his too complex mental mechanisms—by means of the narcotic power of alcohol.

Prof. Patrick finds much to say in defence of his thesis—even for his rather startling view of war as a gigantic "rest-cure"—and says it very well. The cautious reader will, however, feel that he has pressed a sound principle of interpretation much too far—that he has brought into clear relief one factor in the phenomena he analyses, but at the expense of neglecting others of equal significance. Still, *his* factor is undoubtedly one of great importance, and his exposition of its *rôle* is both informative and pleasant to read.

T. P. N.

LETTERS TO THE EDITOR.

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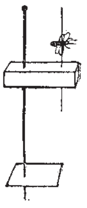
Elasticity and Entomology.

IN NATURE for June 22 (vol. xcvii., p. 340) there appeared an interesting letter under the above heading from the pen of Prof. Bryan. Perhaps I may be permitted to contribute some further remarks on the same subject, although my distance from the centre of Empire must necessarily entail a long delay before publication.

Unfortunately, the method of setting insects upon "Continental" pins does not appear to be "old-fashioned," for a large number of specimens received by me from all countries (excluding England, where, on the other hand, the insects are often set too low) are set in this obnoxious manner. In dealing with the same I always handle them by placing the forceps upon them under the insect, at a point only slightly above the level to which they are to be driven into the cork. Even so, the danger of vibrations, causing loss of antennæ, etc., cannot wholly be obviated. After many years' experience I have come to the conclusion that the shorter pins of English make, be they "silvered," "gold," or black, are in every way preferable to the long German pins. The insect should, however, be set at least half-way up the pin, and not so low down as is necessitated by the construction of many of the peculiar "curved" setting-boards still in use in England.

Using the numbers of the well-known "Kirby and Beard" make of pins, out of the following numbers which I have in use every day, viz. 1, 3, 5, 8, 15, 17, and 19, Nos. 1, 3, 5, and 8 may be classed as *stout*, and can be relied upon never to bend when inserted into cork or "lino," unless handled extremely roughly. Nor, so far as I can see, is there any deterioration in the elastic quality of such pins over a period of at least twenty years. On the other hand, Nos. 15, 17, and 19 must be classed as *slender* pins, and can never be relied upon, for certain, not to buckle under the pressure necessary to place the insect firmly in the cabinet. As all the smaller kinds of insects must be set upon one or other of these pins, or upon the even smaller silver-wire pins known as "caps," I have come to the conclusion that the only safe plan in all these cases is to use the Polyporus strips first suggested by Lord Walsingham—who, I believe, found this fungus growing in Merton Park, and ingeniously turned it to entomological use. As these strips are now sold by at least one firm in Australia, no doubt they are easily obtainable in England. A short piece of the strip is cut off and placed on a No. 8 pin, as shown in the illustration; the finer pin carrying the insect is gently inserted into the other end of the strip. The label may then be placed on the larger pin, below the strip, *facing upwards*, so that it can be read without moving the insect. I have a series of a new species of Coniopterygid, expanse only 3 mm., and the smallest Neuropterous insect known to me, set in this manner upon "caps," and they look extremely neat in the cabinet.



Returning to the subject of vibrations, might I suggest the use of a very simple expedient to obviate the constant breaking-up of the abdomen in those insects with long or fragile bodies, such as dragonflies? This is the process of bristling, which I have used with success for years, but which I have never

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